

CLAIMS

1. A method for externally cuing one or more countermeasure systems and deploying one or more countermeasures, comprising the steps of:
 - acquiring signals from one or more surveillance systems;
 - distinguishing a threat from said signals;
 - communicating a cue signal to a countermeasure system having a countermeasure; and
 - deploying said countermeasure.
2. The method of Claim 1, wherein said step of acquiring signals is selected from the group consisting of acquiring radar signals, acquiring acoustic signals, acquiring magnetic signals, acquiring seismic signals, acquiring infrared signals, and acquiring visible light signals.
3. The method of Claim 2, further comprising the step of preventing a surface-to-air missile from hitting an aircraft.
4. The method of Claim 1, further comprising defeating an airborne threat.
5. The method of Claim 4, wherein said step of defeating an airborne threat comprises defeating a surface-to-air missile.
6. The method of Claim 1, further comprising sending a warning signal.
7. The method of Claim 6, further comprising deploying a surveillance system in an area adjacent to an airport.
8. The method of Claim 7, wherein said step of deploying comprises deploying a surveillance system adjacent to one or more runways of an airport.

9. The method of Claim 1, wherein said step of distinguishing a threat further comprises converting an analog signal to a digital signal.
10. The method of Claim 9, further comprising a step of converting said digital signal to a frequency domain.
11. The method of Claim 10, wherein said step of converting said digital signal to a frequency domain includes implementing of a discrete Fourier transform (DFT).
12. The method of Claim 11, wherein said step of converting said digital signal to a frequency domain includes implementing a fast Fourier transform (FFT).
13. The method of Claim 1, wherein said step of distinguishing a threat further comprises comparing an acoustic signal to a known acoustic signatures of a known surface-to-air missile.
14. The method of Claim 13, wherein said step of comparing further comprises filtering said acoustic signals.
15. The method of Claim 14, wherein said step of filtering further includes using a matched filter corresponding to one or more known surface-to-air missiles.
16. The method of Claim 14, wherein step of filtering further comprises using a digital filter.
17. The method of Claim 16, wherein said step of using a digital filter further comprises using an infinite impulse response (IIR) filter or a finite impulse response (FIR) digital filter.
18. The method of Claim 17, wherein said step of using a digital filter includes using a window function selected from the group consisting of a rectangular window function, a triangular window function, a Bartlett window function, a Hanning window function, a Hamming window function, a Blackman window function, a Kaiser window function, and a Chebyshev window function.

19. The method of Claim 9, further comprising a step of determining position information for an acoustic source.

20. The method of Claim 19, wherein said step of determining position information includes using time-difference of arrival calculations.

21. The method of Claim 20, wherein said position information includes a distance or a bearing.

22. The method of Claim 1, wherein said step of deploying a countermeasure comprises deploying an aircraft-based countermeasure.

23. The method of Claim 22, wherein said step of deploying a countermeasure selected from the group consisting of deploying flares, deploying chaff, and deploying infrared decoys.

24. The method of Claim 1, wherein said step of deploying a countermeasure comprises deploying a ground-based countermeasure.

25. The method of Claim 24, wherein said step of deploying a countermeasure comprises deploying an infrared decoy.

26. A computer-readable medium having computer-executable instructions stored thereon to perform the steps of:

acquiring signals from one or more sensors;

distinguishing a threat from said signals; and

communicating a cue signal to a countermeasure system, wherein said countermeasure system deploys a countermeasure in response to said cue signal.

27. The computer-readable medium of Claim 26, wherein said signals are selected from the group consisting of radar signals, acoustic signals, magnetic signals, seismic signals, infrared signals, and visible light signals.

28. The computer-readable medium of Claim 27, wherein said signals are acoustic signals.
29. The computer readable medium of Claim 26, wherein said step of distinguishing a threat further comprises digitizing said signals and producing a digital signal.
30. The computer-readable medium of Claim 29, wherein said step of distinguishing a threat includes the step of performing a discrete Fourier transform on said digital signal.
31. The computer-readable medium of Claim 30, wherein said discrete Fourier transform is a fast Fourier Transform (FFT).
32. The computer-readable medium of Claim 29, wherein said step of distinguishing a threat further comprises filtering said digital signal.
33. The computer-readable medium of Claim 32, wherein said step of filtering further comprises using a matched filter corresponding to an acoustic signature of one or more known surface-to-air missiles.
34. An externally cued aircraft warning and defense system comprising:
 - a surveillance system operable to detect one or more signals and to send a cue signal; and
 - a countermeasure system operable to receive said cue signal from said surveillance system and to activate one or more countermeasures in response to said cue signal.
35. The system of Claim 34, wherein said surveillance system comprises a sensor array.
36. The system of Claim 35, wherein said sensor array includes one or more sensors selected from the group consisting of radar receivers, acoustic sensors, seismic sensors, magnetic sensors, and photodetectors.
37. The system of Claim 36, wherein said sensors are acoustic sensors.

38. The system of Claim 36, wherein said sensors are photodetectors.
39. The system of Claim 38, wherein said photodetectors include infrared detectors.
40. The system of Claim 39, wherein said infrared detectors comprise a forward-looking infrared array (FLIR).
41. The system of Claim 34, wherein said surveillance system further comprises a signal processor operable to process acoustic signals acquired by said sensor array.
42. The systems of Claim 41, wherein said signal processor further comprises a matched filter, and wherein said signal processor is operable to process acoustic signals received by said sensor array and to distinguish the presence of one or more threats to said aircraft.
43. The system of Claim 41, wherein said signal processor includes a digital signal processor.
44. The system of Claim 34, wherein said surveillance system comprises a sensor field of sensor arrays, pre-positioned near a runway.
45. The system of Claim 34, wherein said countermeasure system comprises a radar jammer onboard an aircraft.
46. The system of Claim 34, wherein said system includes a computer-readable medium having computer-executable instructions stored thereon to distinguish one or more acoustic signatures of known surface-to-air missiles.
47. The system of Claim 46, wherein said computer-readable medium comprises said computer-readable medium of Claim 33.

48. The system of Claim 46, wherein said surveillance system includes said computer-readable medium.

49. The system of Claim 34, wherein said countermeasure system is an aircraft-based countermeasure system.

50. The system of Claim 49, wherein said one or more countermeasures are selected from the group consisting of flares, infrared decoys, and chaff.

51. The system of Claim 34, wherein said countermeasure system is a ground-based countermeasure system.

52. The system of Claim 51, wherein said one or more countermeasures comprises infrared decoys.